TRMM Flight Operations Monthly Status Review (MSR)

June 26, 2002

FOT Subsystem Overview

- Operations Status
  - Flight Ops Summary - Lou Kurzmiller
  - Electrical/Thermal - Dave Sepan
  - RCS - Dave Sepan
  - Power & Deployables - Justin Knavel
  - ACS & FDS / C&DH - Mark Fioravanti
  - RF / Comm - Nega Berhanu
  - LIS - Nega Berhanu
  - CERES & VIRS - Mark Fioravanti
  - TMI - Dave Sepan
  - PR – Justin Knavel
  - Ground System – Justin Knavel
  - Upcoming Activities – Justin Knavel

Flight Operations Summary

- Supported 458 SN events through 25 June
  - 2 Yaw Maneuvers; now +X
  - 4 Delta-V Maneuvers; #402 on or about 29 June

- No Anomaly or Event Reports, 1 Late Acq

Flight Operations Summary

- Notable Events
  - Continued support of ERBS EOL activities.
  - Supported various testing/implementation for TRMM
    - » Xpndr Center Freq testing/implementation
    - » SA +/- 1 Deg (Feathering) & Pwr configuration to 24 Amps (batt)

- FOT stable in May.
- All Console Analysts have completed certification training.

Thermal / Electrical Subsystems

- The Thermal subsystem remains nominal
  - No operational issues since arrival at 402.5 km

- The Electrical subsystem remains nominal
  - No operational issues since arrival at 402.5 km

RCS Subsystem

- RCS performed 3 successful Delta-V maneuvers (#399 - #401)
  - Current fuel remaining is 251 kg by the mass flow method.
  - Current fuel remaining by the PVT method is 232 kg.
  - Current Precision Pressure Transducer level is down to 163.0 psia.
- RCS subsystem is in “blow down” mode and is no longer pressure regulated.
- The current EOL estimate at 402.5 km is April 2004 using 129 kg of fuel as a revised baseline for controlled re-entry.
- Upcoming Events
  - Continue to review and train with Delta-H procedure, EOL scripts, and the “one-shot” procedure.
  - Review all required steps for a 30+ minute Delta-V maneuver and test with the simulator.

Power Subsystem

- Open issues
  - 4 Solar Array Feathering tests were conducted.
    - » 02-150 (May 30th) – Beta Angle 29°
      - Solar Array tracking between +/-1°.
      - Configure Power System for CM_3 (24 A per Battery) and VT 5.
      - Turned Off TSMs 33 and 34 (EOD Battery SOC).
      - Changed Low Power Essential Bus Voltage Threshold to 23.50 V from 24.70 V.
      - Ran for 1 Entire Eclipse period then configured back to nominal operations.
      - Marginal Energy Balance and Day/Night Flag toggles incorrectly.
    - » 02-156 (June 5th) – Beta Angle 5°
      - Solar Array tracking between +/-1°.
      - Configure Power System for CM_3 (24 A per Battery) and VT 6.
      - Turned Off TSMs 33 and 34 (EOD Battery SOC).
      - Changed Low Power Essential Bus Voltage Threshold to 23.50 V from 24.70 V.
      - Ran for 1 Entire Eclipse period then configured back to nominal operations.
      - Marginal Energy Balance and Day/Night Flag toggles incorrectly.

Power Subsystem

» 02-162 (June 11th) – Beta Angle -10°

- Solar Array tracking between +/-1°.
- Configure Power System for CM_3 (24 A per Battery) and VT 6.
- Turned Off TSMs 33 and 34 (EOD Battery SOC).
- Changed Low Power Essential Bus Voltage Threshold to 23.50 V from 24.70 V.
- Changed SA Current Threshold from 10 A to 18 A and SA Voltage Threshold from 80 V to 53.5 V.
- Ran for 3 Entire Eclipse periods then configured back to nominal operations.
- Marginal Energy Balance and Day/Night Flag toggles incorrectly.

» 02-175 (June 24th) – Beta Angle 14° to 32°

- Solar Array tracking between +/-1°.
- Configure Power System for CM_3 (24 A per Battery) and VT 6.
- Turned Off TSMs 33 and 34 (EOD Battery SOC).
- Changed Low Power Essential Bus Voltage Threshold to 24.20 V from 24.70 V.
- Changed SA Current Threshold from 10 A to 20 A and SA Temperature Threshold from 32 ° to -31.5 °.
- Load new TSM Table 21
  - TSM 3 and 4 (Battery 1 and 2 SOC): <=70% - Event Message, <=65% - Loadshed
  - TSM 6 (EBV): <=25 V - Event Message
- Run for approximately 4 days then configure back to nominal operations.
- Meeting Energy Balance.
- Day/Night Flag toggles incorrectly.

Power Subsystem

» Additional Work

- Operations below Beta 14°.
  - Transmitter On as little as possible during eclipse.
  - Track Solar Arrays.
- Fix Day/Night Flag on-board or fix Power Analysis program.
  - Since the Solar Array Current, Voltage, and Temperature do not increase or decrease at a smooth rate while the Solar Array is Feathered, a software patch may be needed to use more than 1 sample or to AND the 3 values together for the Day transition.
- Final TSM Table 21 changes.

– Solar Array off-pointing

» Test Delta V and Yaw maneuvers with simulator

» Longer duration on-board test

Deployables Subsystem

- Solar array drives and HGA continue to operate nominally.

ACS Subsystem

- ACS is performing nominally.
- Mag. Field patch 2000.
  - FOT completed testing of procedures required for uplink patch to the spacecraft.
  - FOT will uplink the patch within next couple of weeks, only waiting for a convenient opportunity GN&C personnel.
- SA Feathering activities are being performed throughout June.
  - See Power Subsystem for more details.

FDS/C&DH Subsystems

- UTCF/FS Status;
  - 3 UTCF Adjustments were performed on 02-150 (May 30th), 02-162 (June 11th) and 02-173 (June 23rd).
    - » Current UTCF value is 31535996.803904 sec
    - » The next Adjustment is expected on 02-182 (Mon., July 1st)
  - No FS Adjustment was performed.
    - » Current FS value is x'7EA'.
    - » The next Adjustment is expected on 02-182 (Mon., July 1st), and will be adjusted to x'7F6'.
- Planned RTS Changes
  - Nominal TDRS AOS RTS format changes to allow easier modification as DS storage status changes, and to simplify transponder offsets if required.
  - Initially will be performed with RTSs 65 - 68, other AOS RTSs may also be converted later.

FDS/C&DH Subsystems (cont'd)

- Loaded
  - » RTS # 3, 127, 128
  - » RTS # 106 & 107 → GN/DSN AOS

RF Subsystem

- 1 Late Acquisition occurred since last MSR.
  - GLA #121: Occurred on 02-167 (June 16) during the 122348z TDW/SA2 event. The S/C was acquisition 1 minute late. 1 GCMR was sent; all data was recovered.
- No RF Event Reports this month.
- Frequency offsets (monthly average)
  - Transponder #1 = + 374.990 Hz (Previously = + 762.788)
  - Transponder #2 = + 103.902 Hz (Previously = - 759.874)
  - S/C RTSs #59 and #60 are being used to perform both Transponder #1 & 2 frequency offsets.
  - S/C RTSs #127 and #3 was updated on 02-158 (June 7th) with the start S/C RTS #60 to ensure that the Center Frequency Offset for Transponder#2 executes prior to turning on the transmitter.

LIS Instrument

- 2 Routine MSFC real-time command requests were performed on 02-162 (June 11th) and 02-175 (June 24th) to reduce packet sequence errors.
- No open issues

CERES/VIRS Instruments

- **CERES**.
  - Powered OFF.
- **VIRS**, continues to operate nominally.
  - Two sets of VIRS Solar Calibrations were performed on 02-155 (Tues., June 4th).

TMI / PR Instruments

- No Open Issues with the TMI instrument

- No Open Issues with the PR instrument
- PR LNA performed on 02-153 (June 2nd).

Ground System / Security

- Security Scans – June 27th
- RTADS work is on-going.
- FORMATS release should be installed within a week.

Upcoming Activities

- 0-2 Months
  - Perform SA Feather (+/- 1°) Test
  - Perform remaining FSW revisions due to new Kalman Filter mode of operations and Boost activities
    - » 2000 Epoch Magnetic Field Patch
    - » Table 51 DSS Tolerance Versions
    - » Table 54 Update for Roll/Pitch/Yaw to 15°/8°/8°
  - Place remaining permanent table / patch changes into EEPROM
  - Support finalization of TRMM End of Life and Reentry Plan
  - Perform SA 55° offset long-duration test

Upcoming Activities

- 2-3 Months
  - Install new TDRS HGA AOS RTSs
  - Participate in End of Life Plan review(s)
  - End Of Life Plan Testing, and Simulations
  - Continue to close open CCRs, MOCRs, and MSR Action Items